

**WHAT IS CLAIMED IS:**

1. A method for controlling reproduction in an organism comprising administering to the organism an immunogenic composition comprising at least one component selected from the group consisting of (a) a polypeptide comprising a zona pellucida protein or an immunogenic fragment thereof and (b) a polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising a zona pellucida protein or immunogenic fragment thereof, wherein the organism is selected from the group consisting of a bird, a fish, a reptile, an amphibian, an insect, an arachnid and an oocyte-producing parasite.
2. The method of claim 1 wherein the immunological composition causes temporary, reversible infertility in the organism.
3. The method of claim 1 wherein the immunological composition causes permanent, irreversible infertility in the organism.
- Sub a1 → 4. A method for treating or preventing a reproductive disorder or disease in an oocyte-producing organism comprising administering to the organism an immunogenic composition comprising at least one component selected from the group consisting of (a) a polypeptide comprising a zona pellucida protein or an immunogenic fragment thereof and (b) a polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising a zona pellucida protein or immunogenic fragment thereof.
5. The method of claim 4 wherein the oocyte-producing organism is selected from the group consisting of a bird, a fish, a reptile, an amphibian, an insect, an arachnid or an oocyte-producing parasite.
- Sub A2 → 6. The method of claim 5 wherein the oocyte-producing organism is a bird and wherein the reproductive disease or disorder is selected from the group consisting of egg-binding disease, dystocia, egg-related peritonitis, oophoritis,

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neoplasia of the reproductive tract, prolapsed oviduct and cloaca, salpingitis, metritis, oviduct impaction, cloacal problems, cystic hyperplasia, ectopic egg formation, and chronic egg laying.

7. The method of claim 5 wherein the oocyte-producing organism is a reptile and wherein the reproductive disease or disorder is selected from the group consisting of egg-binding disease, dystocia, egg-related peritonitis, oophoritis, neoplasia of the reproductive tract, prolapsed oviduct and cloaca, salpingitis, metritis, oviduct impaction, cloacal problems, cystic hyperplasia, ectopic egg formation, and chronic egg laying.

8. The method of claim 5 wherein the oocyte-producing organism is a fish and wherein the reproductive disease or disorder is selected from the group consisting of egg-binding disease, dystocia, egg-related peritonitis, oophoritis, salpingitis, oviduct impaction and ectopic egg formation.

9. The method of claim 5 wherein the oocyte-producing organism is a rabbit and wherein the reproductive disease or disorder is selected from the group consisting dystocia, peritonitis, neoplasia of the reproductive tract, neoplasia of the mammary glands, metritis and cystic hyperplasia.

10. A method for controlling behavior in an oocyte-producing organism comprising contacting the organism with an immunogenic composition comprising at least one component selected from the group consisting of (a) a polypeptide comprising a zona pellucida protein or an immunogenic fragment thereof and (b) a polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising a zona pellucida protein or immunogenic fragment thereof.

11. The method of claim 10 wherein the oocyte-producing organism is selected from the group consisting of a bird, a fish, a rabbit and a reptile.

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Fig 9 a3 →

12. The method of claims 1, 4 or 10 wherein the zona pellucida protein is a glycoprotein.
13. The method of claims 1, 4 or 10 wherein the zona pellucida protein is a naturally occurring protein.
14. The method of claims 1, 4 or 10 wherein the zona pellucida protein is a recombinant protein or synthetic protein.
15. The method of claims 1, 4 or 10 wherein the zona pellucida protein comprises at least one zona pellucida protein selected from the group consisting of a porcine zona pellucida protein and an avian zona pellucida protein.
16. The method of claims 1, 4 or 10 wherein the polypeptide further comprises a T cell epitope, a helper T cell or a B cell epitope.
17. The method of claims 1, 4 or 10 wherein the immunogenic composition further comprises an adjuvant.
18. The method of claim 17 wherein the adjuvant is selected from the group consisting of Freund's Complete Adjuvant, Freund's Incomplete Adjuvant, Freund's mycotoxin-free adjuvant, aluminum hydroxide, a cell wall extract derived from non-pathogenic *Mycobacteria* spp., a long-chain polydispersed  $\beta(1,4)$  linked mannan polymer interspersed with O-acetylated groups, permulium and synthetic trehalose dicorynomycolate (STDCM).
19. The method of claim 18 wherein the adjuvant is selected from the group consisting of aluminum hydroxide and STDCM.
20. The method of claims 18 wherein the organism is a companion bird, and wherein the adjuvant is aluminum hydroxide.

Sub 4 > 21. The method of claims 1, 4 or 10 wherein the immunogenic composition excludes an adjuvant.

22. The method of claim 21 wherein the oocyte-producing organism is a bird or a reptile.

Sub A5 > 23. The method of claims 1, 4 or 10 wherein the immunogenic composition comprises a zona pellucida protein or immunogenic fragment thereof.

24. The method of claim 1 wherein the polynucleotide comprises a vector.

25. The method of claim 24 wherein the vector is a viral vector.

26. The method of claim 1 wherein the polynucleotide further comprises a regulatory sequence operably linked to the nucleotide sequence encoding the zona pellucida protein or immunogenic fragment thereof.

Sub A6 > 27. The method of claims 1, 4 or 10 wherein the immunogenic composition comprises an immunogenic conjugate comprising a zona pellucida protein or a fragment thereof, conjugated to a carrier molecule.

28. The method of claim 29 wherein the immunogenic conjugate is dually functional.

29. A method for affecting the reproductive system of an oocyte-producing organism comprising administering to the organism an immunogenic composition comprising an immunogenic conjugate comprising a zona pellucida protein or fragment thereof conjugated to a carrier molecule, wherein the oocyte-producing organism is selected from the group consisting of a bird, a fish, a reptile, an amphibian, an insect, an arachnid and an oocyte-producing parasite.

30. A method for pest management comprising contacting a pest with an immunogenic composition comprising at least one component selected from the group consisting of (a) a polypeptide comprising a zona pellucida protein or an immunogenic fragment thereof and (b) a polynucleotide comprising a nucleotide sequence encoding a polypeptide comprising a zona pellucida protein or immunogenic fragment thereof.
31. The method of claim 30 wherein the pest is an amphibian, an insect, an arachnid or an oocyte-producing parasite.
32. The method of claim 30 wherein the zona pellucida protein is a glycoprotein.
33. The method of claim 30 wherein the zona pellucida protein is a naturally occurring protein.
34. The method of claim 30 wherein the zona pellucida protein is a recombinant protein or synthetic protein.
35. The method of claim 30 wherein the zona pellucida protein is a porcine zona pellucida protein or an avian zona pellucida protein.
36. The method of claim 30 wherein the immunogenic composition further comprises an adjuvant.
37. The method of claim 36 wherein the adjuvant is selected from the group consisting of Freund's Complete Adjuvant, Freund's Incomplete Adjuvant, Freund's mycotoxin-free adjuvant, aluminum hydroxide, a cell wall extract derived from non-pathogenic *Mycobacteria* spp., a long-chain polydispersed  $\beta(1,4)$  linked mannan polymer interspersed with O-acetylated groups, permulium and synthetic trehalose dicorynomycolate (STDCM).

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38. The method of claim 30 wherein the immunogenic composition excludes an adjuvant.

39. The method of claim 30 wherein the immunogenic composition is administered in the form of a baited trap.

40. The method of claim 30 wherein the pest is a fire ant.

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